

AVIATION

AUG 20 1928

The Oldest American Aeronautical Magazine

August 18, 1928

Issued Weekly

PRICE 20 CENTS



Action picture of an Alexander "Eaglerock" banking into a turn

VOLUME
XXV

Special Features

The Crawford Metal Plane
Specifications of the Material
The Aero Corporation of California

NUMBER
8

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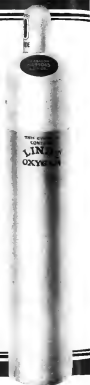
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AVIATION

The Oldest American Aeronautical Magazine

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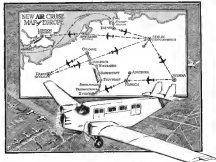
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AVIATION



The Oldest American Aeronautical Magazine

Vol. XXV

AUGUST 26, 1928

No. 8

Other Opinions

IN AN endeavor to ascertain the opinions of our readers regarding a most important subject the following editorial was printed in the July 30 issue of AVIATION:

ARE THEY WORTH WHILE?

The day when exhibition flights were the main stay of commercial aviation has never far from us. There is still the same need to attract passengers to flying fields. Many fields, especially the smaller ones, parasite jumps are conducted as regular terminals so as to draw the crowd. At most of the fields where business is well established, parasite jumping is discouraged if not actually forbidden, and there has been a considerable amount of talk about the Department of Commerce extending its regulations to practically prohibit exhibition jumps.

The question has many interesting angles and deserves a candid and frank discussion, for it could not even fail to excite the interest of a broad cross-section, which in these parts has played a very important part in the industry, without going into the matter pretty thoroughly. Personally, AVIATION believes that such talking and other events in connection with a flying field are not worth while and that parasite jumps by trained personnel with paid equipment are worth while. We would, however, like to hear from others on the subject and would welcome letters from flying field operators and others.

The following are extracts from two of the letters received.

Continued

"I am particularly in accord with AVIATION as outlined in the last half of the last paragraph of the editorial entitled 'Are They Worth While?' Recently when the National Air Trip came through San Diego I had an object lesson along these very lines. A good friend of mine who is spending a great amount of his time and money in developing a well-known parasite company had arranged with three qualified jumpers to give exhibition jumps just before the National Air Trip planes left the field.

A ruling by the local Department of Commerce it seems prohibited making this jump. I went with my friend with the idea in mind of presenting some argument to the official at the local Department of Commerce so that he would alter his rule. He had left the field

so my friend was put to some considerable expense and was unable to exhibit his merchandise before what I consider about twenty-five of the most prominent pilots in the United States.

"The parasite undoubtedly has its place and when conducted with qualified and trained parasite jumpers, I can see no reason why regulations should not be provided which would allow its use."

Very truly yours,

(Signed) A. J. Edwards

Continued

"We who make a living as parasite jumping feel that sooner or later we will be stopped. It has been pointed out to me that many jumpers do not know the best people of packing or handling parachutes and also that many use old and obsolete parachutes. I will agree on these two points but I do not believe that we should all be blamed the same and made to quit the work that we have done for years.

"We feel that a parachute in proper hands, properly folded, and in good condition is not dangerous. We also feel that our work requires considerable skill and is not a mere demonstration. I, myself, have made over 1,000 jumps from balloons and airplanes in the past fifteen years without breaking a bone or meeting with a serious mishap.

"In the past ten years I have not lost a student or injured any of them, and I have educated several well-known jumpers who are at the game yet.

"We believe that much has been learned about parachute through our work to improve and make the life saving equipment more sensible. Many people come out to flying fields to see these jumps when they would not come just to see the planes fly.

"It has been pointed out to me that every facility in the parasite jumping line was a detriment to aviation in general. I do not believe that over fifteen fatalities happened in the entire country during the run of the last season but I do believe that most of these were due to inexperienced jumpers and the use of old and obsolete equipment. The instance was when the jumper fell his chute in the air after his harness broke loose. Another was a boy, who, jumping for the first time, had the pilot chute caught in his legs and did not have the pressure of wind to push it free. It is things like this that ruin the business for the ones who have made it a life's study."

Yours very truly,

(Signed) J. J. Decker,

"The Flying Dutchman"

327

Care and Maintenance of Siemens Engines

By T. CLAUDE RYAN
President, Ryan Aircraft Corp.

SIEMENS engines have been in service in American aircraft since January, 1937, and are used as standard and/or optional equipment on 15 models of planes in current production. A description of these engines is herewith presented.

The Siemens radial six-cylinder airplane engines are built in five, seven and nine cylinder forms. Each engine has a bore of 180 mm. (7.09 in.) and a stroke of 130 mm. (5.12 in.). All three sizes have dual magnetos (ignition). The five cylinder engine is provided with one carburetor, while the seven and nine cylinder engines are provided with two.

The construction of these engines is an aluminum alloy casting right on the center line of the cylinders. It is a half taper—both through-bore which give an extremely rigid mounting for the two-piece lower cylinder crankshaft. It is a very rigid construction and the elimination of all ball-bearings, it is unnecessary to lift or disassemble the crankshaft until after several hundred hours of service. The ball and roller bearing construction used in one of the principal features in the design of these engines.

Carburetor Belief in Monoblock

The main drives and valve tappet guides are located in the forward half of the crankcase. The circular induction manifold is located in the rear half of the crankcase. The carburetors are belted in this circular manifold, and each cylinder is thus connected to it with an exhaust pipe having an expansion joint, equipped with a rubber gasket to provide an leak and absorb the expansion and contraction of the cylinder.

The crankshaft is a high grade chrome nickel steel forging, fully machined and hollow drilled to eliminate all unnecessary weights. The counterbalance weights are attached by means of cross bolts and down pins. Naturally, the rear end of the crankshaft has to transmit a comparatively small amount of power and is consequently lighter in construction. The two halves of the crankshaft are connected by means of a long taper with a nut and down pin.

In designing this shaft every consideration was given to the development of a high-speed balanced crankshaft of the best quality, which would permit the use of a two-piece drop-belt master rod. The crankshaft is mounted entirely on ball and roller bearings. It has one small bearing bearing at the accessory drive end, which is connected with the timing system, which will be mentioned later.

The connecting rods are of tubular shaped tempered steel, completely machined and are very sturdy and mechanically light. All connecting rods are subject to very careful tests. They must of necessity be of equal weight

and have equal positions of equilibrium. The pistons are made of an aluminum alloy with bronze bushings cast into the piston pin bosses. These bushings are ground at the outer edges to hold the piston pin without side rubbing, which permits the piston pin to float freely in both



Front quarter view of the Siemens nine cylinder aircraft engine

the piston and connecting rod. The connecting rods are approximately long life in piston pins and bearings.

The cylinders are of two-piece construction with an aluminum alloy head secured on a steel journal sleeve, belted with a taper expansion wedge ring. This demonstrates any possibility of gas leaks occurring around the threaded joint. The cylinder head is equipped with bronze bushings for stabilization of spark plugs. Valve guides of conventional design are belted in place by two

(Continued on page 534)

Crawford Metal Plane

A Parasol Type Monoplane With the Full Cantilever Junkers Wing and Powered With a 165 Hp. Gnome Engine

AN interesting experimental monoplane, and as the first all metal airplane to be built in Southern California has recently been completed by Harvey Crawford, well known Los Angeles aircraft designer. Particular interest attaches to the performance of this plane because Mr. Crawford has not only attempted to adapt the German Junkers type of construction to the needs of American aircraft operators, but he has also designed his plane to use the Junkers wing moment about a instead of below the fuselage.

Has Experimental Label, No. 164

The completed plane, known as the Crawford Metal Plane No. 1, experimental license X-164, is an all metal plane, two place, parasol type monoplane with full cantilever wing. Initial flight tests made from Hyatt's Air port, Los Angeles by Pilot Junior Angel indicate a high speed of 148 m. p. h. climb at sea level of 1000 ft. per sec., and a landing speed of 30 m. p. h. For these tests the plane was provided with a Gnome, rotary engine, of 165 hp. and carried no load other than pilot and 20 gal. of gasoline. The total useful load of this airplane has been estimated to be 1800 lb., and the absolute ceiling with full load is better than 20,000 ft.

The plane demonstrated both lateral and longitudinal stability in flight, returning to normal from position near any angle without the use of the controls. One feature upon which the test pilot particularly remarked was the unusual stability of the plane and its ability to climb rapidly at low angles of true incidence. When conditions were experienced with the original landing gear, which employed shock cord and would directly control the rate, and this has been replaced by a shocker type gear with a shock strut extending up in the wing from each wheel.

The overall length of the plane is 34 ft. 0 in. The

backing, long of monocoque type, with all stresses carried in the corrugated duralumin covering which is 20 gauge in front of the pilot's cockpit and 22 gauge to the rear of the cockpit. Bulkheads are built in at approximately 26 in. intervals throughout the length of the fuselage. These bulkheads are of rectangular form and at each corner four thick pieces of 14 gauge duralumin have been riveted in the bulkhead and to the sheathing to keep the latter from twisting at the corners. The engine carries a main crank which is turned over the rectangular form of the fuselage thus providing a certain degree of structural stiffening, although not marked. A main crank handle is built along top of fuselage. The tail surfaces are all 20 gauge, corrugated duralumin riveted in tubing. The floor is built into the fuselage, the duralumin sheathing which forms the under side of the fuselage.

Has a 34-Ft. Tapered Wing

The wing span is 34 ft. The wing tapers in plan from 14 ft. 6 in. at the outer to 3 ft. 3 in. at the tips, and is 10 chords from 13 in. at the outer to 4 in. at the tips. Some chord is provided on the bottom of the wing due to the taper but the top is flat all the way across. The wing is mounted but four inches above the upper leading edge of the passenger cockpit, somewhat decreasing the visibility on this plane. Access to the passenger compartment is obtained by means of a large door on the right hand side.

German Junkers practice has been followed in the internal structure of the wing which is 8 ft. 6 in. apart type with its chord and corrugation stresses carried largely in the covering. The corrugated duralumin sheathing which is employed for the wing covering varies from 20 gauge at the outer to 26 gauge at the wing tips. This sheathing is riveted to the spar which are arranged five above and

(Continued on page 534)



Front quarter view of the new Crawford Metal Plane No. 1

The "Sign Carrier I"

*Keystone Biplane Powered With One "Wasp" and Two "Whirlwinds"
and Equipped for Night Advertising Work*

THE Keystone Aircraft Corp., manufacturers of the Keystone transport biplane at Trinidad, Pa., has completed a new plane, equipped to carry a large electrically illuminated sign for use in aerial advertising at night. The plane, which is known as "Sign Carrier I," was recently delivered to Aerial Advertising, Inc., of New York, and is now at Roosevelt Field, L. I., where it is undergoing a series of extremely rigid tests, carrying an illuminated sign that measures 90 ft. in length and 6 ft. 6 in. in height.

The lights used in illuminating the advertising messages to be carried by the plane, are attached to the underside of the plane's lower wing and measure 6 ft. 6 in. in length. The tests conducted thus far at the Long Island field have proved that these lights may be used easily by persons on the ground when the plane is flying at an altitude of 3,000 ft. or under, and that they are visible at an altitude of those miles. The range of visibility makes it possible for the plane to fly over the most densely populated areas in an advertising work.

The "Sign Carrier" is similar to the Keystone transport biplane, "Pulsifer," which was used as a basis in designing the new plane. It does, however, embody a number of new features. The span of the Pulsifer's lower wing is only 75 ft. For the purpose of signs carrying additional area was provided on the Sign Carrier, making the span 90 ft. The additional panels are hinged

in position and are easily removed. To support the panels, diagonal struts from the outer edges to the upper joint of the main wing struts have been added. As a means of further increasing the strength of the wing structure to provide for the weight of the large sign, the single bay of the Pulsifer has been discarded. For the "Sign Carrier," two intermediary struts have been added between the fuselage and the main struts on each side.

Wooden Straps to Hold Signs

Small strips of bass wood, measuring 2 1/4 in. in width, are mounted on the underside of the lower wing. The letters of the signs carried by the plane will be secured to these strips. A portion of the cabin of the plane resembles a small electrical laboratory. There is a switchboard and work bench provided with protective bakelite panels. The electric power for illuminating the sign is obtained from six wind driven generators mounted on the wing. For safety, there are two independent lighting circuits. The wiring of each circuit is insulated and is led through conduits. Four conduits have been provided, and these are eight transformer box enclosures with doors in each lower wing. Navigation and landing lights have been installed also.

While the plane was designed primarily for the purpose (Continued on page 546)



Side view of the new Keystone biplane, "Sign Carrier I," built for Aerial Advertising, Inc.

The Aero Corporation of California

By CHARLES F. McREYNOLDS

ONE of the most significant airline operations in the United States is the Los Angeles—Phoenix—Tucson route which has been successfully flown by the Aero Corporation of California since November 28, 1925. This company has pioneered an acknowledged secondary without the substance of a real contract or the prestige which such a service gives to passenger carrying. The Aero Corporation of California has said so much in this venture that it has been available for opening up the route for the first time in the history of the service. As Louis Paul E. Ralston, Jr., vice president of the company, stated, "The line has had to pay its own way from the start or be forced to suspend operations."

Support Reduces Passenger Rates

Public support of this airline was so great during the first three months of its operation as to make it possible to reduce passenger rates one third on March 1, 1928, and place them practically on a par with railroad fares between the cities served. This is an indication of the success that other well organized passenger carrying airlines throughout the country may expect.

Flying equipment on the Los Angeles-Tucson route consists of two Fokker Universal Wright engine monoplanes. The aircraft is an east and west business between Los Angeles and Phoenix. There are extensive emergency landing fields, but no night flying equipment, the three round trips weekly being flown in daylight. The distance between Los Angeles and Phoenix is 290 mi. by

air as compared to 470 mi. by auto highway. From Phoenix to Tucson is 100 mi. by air and 202 by road. The time saving is at once apparent for it is only four hours by air from Phoenix to Los Angeles. The same trip by auto with all the attendant inconveniences of heat, dust and discomfort takes 16 hr., and by train the time is 14 hr.

The scenic interest on this route is unparalleled from the standpoint of variety, the planes from Los Angeles passing over some principal Southern California cities, thousands of acres of orange groves, across the San Joaquin Mts., Palm Springs, which is a famous winter resort, Salton Sea which is below sea level, the Colorado river, San Geronimo Pass, Salt River Valley and many other points of unusual interest.

Monotonous Six Hour Schedule

The Los Angeles plane leaves at 10:00 A. M. on Mondays, Wednesdays and Fridays, arriving in Phoenix 4 hr. 20 min. later. A stop of 15 min. is made at Phoenix after which a flight of 1 hr. 25 min. places the plane in Tucson. Planes leave Tucson for Los Angeles on alternate days, starting at 8:00 A. M. Flying over this route is done by Latham, Jack Frye and Paul E. Ralston, Jr. and Pilot Lee Wiley is spins most of the flying is entrusted. The monotonous schedule necessary for safety is only 200 ft. which greatly simplifies operating problems.

Although the present operating consists of the single (Continued on page 546)



One of the Fokker Universals operated by Aero Corporation of California about to take off

Reviews

Wheeling Foldable Factory Opened

WHEELING, W. VA.—The Foldable Aircraft Co. of America, Inc., has just opened its new plant in this city, and will produce folding aircraft for the winter season. The new plant is located at the corner of Third and Third streets, and will produce folding aircraft for the winter season. The new plant is located at the corner of Third and Third streets, and will produce folding aircraft for the winter season.

Minneapolis Hosts First Annual Aircraft Show

MINNAPOLIS, Minn.—The first annual aircraft show in Minneapolis, Minn., was held at the Minneapolis Convention Center, from December 1st to 3rd. The show was a great success, and attracted a large number of visitors. The show was a great success, and attracted a large number of visitors. The show was a great success, and attracted a large number of visitors.

Three Day Air Meet Scheduled at Byram

BYRAM, N. Y.—A three day air meet will be held at Byram, N. Y., on December 1st, 2nd, and 3rd. The meet will be held at the Byram Airfield, and will feature a variety of aircraft. The meet will be held at the Byram Airfield, and will feature a variety of aircraft. The meet will be held at the Byram Airfield, and will feature a variety of aircraft.

Beece is Winner in Colorado Race

Colorado Buff in Colorado trial Three Day Race at Fort Collins, Colo.

Fort Collins, Colo.—The Colorado Buff, a three day race, was held at Fort Collins, Colo., on December 1st, 2nd, and 3rd. The race was a great success, and attracted a large number of visitors. The race was a great success, and attracted a large number of visitors. The race was a great success, and attracted a large number of visitors.

Fort Collins, Colo.—The Colorado Buff, a three day race, was held at Fort Collins, Colo., on December 1st, 2nd, and 3rd. The race was a great success, and attracted a large number of visitors. The race was a great success, and attracted a large number of visitors. The race was a great success, and attracted a large number of visitors.

Unauthorized

Unauthorized use of the Stinson name in advertising is strictly prohibited. The Stinson name is a registered trademark of the Stinson Aircraft Corporation, and its use in advertising without the written consent of the corporation is unauthorized.

Again—Stinsons Lead All Single Motor Cabin Planes!

in the NATIONAL RELIABILITY AIR TOUR OF 1922



The Stinson Junior is a thoroughly reliable airplane for general use, capable of carrying a full load with the maximum speed of 100 miles per hour. It is a single motor cabin plane, and is the most reliable and economical airplane of its class.



The Stinson Detachable is a thoroughly reliable airplane for general use, capable of carrying a full load with the maximum speed of 100 miles per hour. It is a single motor cabin plane, and is the most reliable and economical airplane of its class.

Stinson planes led all other planes in the National Reliability Air Tour of 1922, having won more prizes of value than any other plane.

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The Official Tour results printed below are of vital importance to the prospective purchaser. Quite frequently it is difficult for the intending buyer to obtain accurate information about speed, load carrying ability, take-off and landing time of various airplanes. The National Reliability Air Tour provides this information. Compare Stinson with EVERY plane in the 1922 National Reliability Tour for speed with load, take-off with load, horse power with load and fuel, but not least, the **LOAD CARRIER**.

Official Rating and Score in 1922—National Air Tour

Planes	Engine	Max. Speed	Max. Load	Max. Horse Power	Max. Fuel	Max. Range	Max. Altitude	Max. Price
1. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
2. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
3. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
4. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
5. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
6. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
7. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
8. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
9. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
10. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
11. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
12. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
13. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
14. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
15. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
16. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
17. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
18. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
19. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100
20. Stinson Junior	Whitcomb	100	1000	100	100	100	100	100

Chicago-Atlanta Line Contracted

*Interstate Air Lines of Chicago
to Fly Mail On New
Route*

WASHINGTON, D. C.—Interstate Air Lines, Inc., at Chicago 11, has been awarded the contract for the mail on the Chicago and Atlanta, which is reported to be one of the important parts of the system. The line is 290 mi long and the bid accepted. Postmaster General New was 75 cts per lb. It is stipulated in the contract that operation must begin within six months from the date of award, but it is possible that the Postoffice Department will require operation before the expiration of that time at expense of the contractor, in order to meet the new, improved rate.

Scudder Ends New Company

Lawrence W. Scudder of Chicago is president of Interstate Air Lines, and Robert T. Shannon is secretary-treasurer. The company was not the lowest bidder for the contract. A bid of 61 cts per lb. was returned but not accepted.

The route runs from Chicago to Terre Haute and Evansville, Ind.; Nashville and Chattanooga, Tenn.; and Atlanta, Ga., with a stop from Evansville to St. Louis, Mo. It will make connections at Atlanta with the Atlanta-New Orleans route and with a route to be established from Atlanta to Miami. Connections will be made at Chicago with the St. Paul-Minneapolis route, with the St. Louis-Memphis route, and with the route connecting important points in Michigan.

Making Lighting Survey

It is necessary to begin operation before the expiration of the temporary permit which the line will be holding in day time operations and the Department of Commerce should have completed the lighting at the way for night flying. The survey for the lighting is nearly completed, and the lights probably will not be installed in less than six months.

The schedule which will be in effect when the lighting equipment is installed is as follows:

DAILY SCHEDULE (Central Time)

Southbound	Northbound
CHICAGO 12:00 P.M.	CHICAGO 12:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.
ST. LOUIS 1:00 P.M.	ST. LOUIS 1:00 P.M.

Summit Air Club Opens Ohio Field

AKRON, O.—The Summit Air Club has opened a three-field area on Centre, on the Cleveland-Massillon road. A workshop and hangar are to be completed shortly, and plans have been made for a volunteer airport club house. The new airport will have the runway, lighting equipment will include flood lights, a rotating beacon light and red and green lights around the perimeter of the field.

A. J. McManis, president of the new flying club, is to have charge of the field. Dunlap, who has been engaged in agricultural activities in Akron for the past year, formerly was with the Airport Service Corporation Co., Inc., at Chicago.

The new airport is to be a center of the usual recreational activities. The club plans to offer a flying course at an experimental school, and to maintain commercial flying service to Cleveland and Columbus.

Robertson Passenger Line Opens August 20

ST. LOUIS, MO.—The Eastern Airfield Corp. has just received two Ford-Stout airplanes which, starting August 15, will be used in the regular passenger service between Chicago and St. Louis. The first of these planes brought down from Illinois by Horton E. "Doc" Gentry, chief pilot, and Arthur Robertson, recently named from a successful flight at the Ford Field, St. Louis. The line is owned by the Ford Motor Co. and is operated by the Eastern Airfield Corp.

The new schedule for passenger service on the line will be as follows: St. Louis 12:00 P.M., arrive Chicago 12:00 P.M., leave Chicago 3:00 P.M., arrive St. Louis 5:00 P.M. In addition the mail plane will leave at regular times at 15 P. M. to return the mail starting at 6 A. M.

In order that the Ford-Stout may still remain safe on Sundays and holidays, a plan of regular regular flying is being developed by H. J. McManis, chief pilot.

No Hangar Bird Received

HELENA, MONT.—City Engineer Thomas E. Smith has just received a letter from the city of Helena, Mont., asking for the return of a hospital of the city after which he had been taken. The letter was signed by W. D. Ferguson, city street commissioner.

Schedules Announced For L. A.-Dallas Line

LOS ANGELES, CALIF.—Schedules for the Los Angeles to Dallas passenger and express service to begin tomorrow it was officially announced here recently by Jack Fry, president of Standard Air Lines, Inc., which is behind the project. Time from Los Angeles to Dallas will be 12 hrs. 30 min. and from Dallas to Los Angeles will be 12 hrs. 30 min. The flight will be operated by the Standard Air Lines, Inc., which is behind the project. Time from Los Angeles to Dallas will be 12 hrs. 30 min. and from Dallas to Los Angeles will be 12 hrs. 30 min. The flight will be operated by the Standard Air Lines, Inc., which is behind the project.

Next spring a similar line will be established from Dallas to Houston, San Antonio, Austin, El Paso, Fort Worth, and Dallas. The line will be operated by the Standard Air Lines, Inc., which is behind the project. Time from Los Angeles to Dallas will be 12 hrs. 30 min. and from Dallas to Los Angeles will be 12 hrs. 30 min. The flight will be operated by the Standard Air Lines, Inc., which is behind the project.

Seven special Fokker cable airplanes powered with 225 H.P. Havon engines, are already under construction for the new service. These will have a range of 115 mi. and will carry two pilots and eight passengers. The Standard Air Lines will operate the longer commercial passenger line to the United States. Office at Los Angeles.

New Portland-Madison Line

PORTLAND, ORE.—A daily passenger service connecting Portland, Eugene, Medford and Madras, Ore., has just been announced by the Western Air Lines, Inc., which is behind the project. The line will be operated by the Western Air Lines, Inc., which is behind the project. Time from Portland to Madras will be 12 hrs. 30 min. and from Madras to Portland will be 12 hrs. 30 min. The flight will be operated by the Western Air Lines, Inc., which is behind the project.

Fort Dodge Field Dedicated

FORT DODGE, IOWA.—Twenty-seven planes, including Air Corps, have been dedicated at the new airport at Fort Dodge, Iowa, which is behind the project. The line will be operated by the Western Air Lines, Inc., which is behind the project. Time from Fort Dodge to Madison will be 12 hrs. 30 min. and from Madison to Fort Dodge will be 12 hrs. 30 min. The flight will be operated by the Western Air Lines, Inc., which is behind the project.

Vote \$1,000,000 for Kansas City Airport

KANSAS CITY, MO.—A bond issue of \$1,000,000 has been voted by the people of Kansas City for the purchase and construction of an airport. The airport will be the same field now operated by the city under a lease and is located in the heart of the city. The bond issue will be used to pay for the construction of the airport. The airport will be the same field now operated by the city under a lease and is located in the heart of the city. The bond issue will be used to pay for the construction of the airport.

The airport will be the same field now operated by the city under a lease and is located in the heart of the city. The bond issue will be used to pay for the construction of the airport. The airport will be the same field now operated by the city under a lease and is located in the heart of the city. The bond issue will be used to pay for the construction of the airport.

Sabine Firm Acquires Field at Port Arthur

BEAUMONT, TEX.—The Sabine Airway, Inc., operators with headquarters at Beaumont, Tex., have just acquired a field at Port Arthur, Tex., and will maintain a school and passenger service. The line will be operated by the Sabine Airway, Inc., which is behind the project. Time from Beaumont to Port Arthur will be 12 hrs. 30 min. and from Port Arthur to Beaumont will be 12 hrs. 30 min. The flight will be operated by the Sabine Airway, Inc., which is behind the project.

The Sabine Airway, Inc., a subsidiary of the Texas Air Corp. of Dallas, Tex., longer maintains a school and passenger service at Beaumont, Tex., and will also take over the operation of the airport at Port Arthur, Tex., which is behind the project. The line will be operated by the Sabine Airway, Inc., which is behind the project.

The company has a New agency for Southwest Texas and is using the type of plane in its passenger carrying and instruction work.

Oakland Field Not So Pleasant

OAKLAND, CALIF.—A new "industrial park" road has been built at the Oakland municipal airport. A route which is being built at the Oakland municipal airport. A route which is being built at the Oakland municipal airport. A route which is being built at the Oakland municipal airport.

Mills Field Has a Big Traffic Gain

SAN FRANCISCO, CALIF.—The July report of business at Mills Field, San Francisco's municipal airport, was completed, showing a gain over June of approximately 15 per cent in flights and landings and 19 per cent in passengers, with a total of 1,000 flights and landings and 4,700 passengers. The June figures represented 1,000 flights and landings and 4,700 passengers. The July report of business at Mills Field, San Francisco's municipal airport, was completed, showing a gain over June of approximately 15 per cent in flights and landings and 19 per cent in passengers, with a total of 1,000 flights and landings and 4,700 passengers.

The Department has the establishment of a new landing field at least every 20 mi. along its route. As many as possible of the municipal fields along the way will be acquired. Mills Field is not available to the government. It will leave lands, like Bays and in the rough, which is necessary to the city. Mills Field is not available to the government. It will leave lands, like Bays and in the rough, which is necessary to the city.

Dedicate Stout Field With 10,000 Attending

AUSTIN, MINN.—Eminent aviators marked the opening recently of Stout Field, Austin's new municipal airport, with 10,000 people. The field is the Stout Airplane Corp., a division of the Ford Motor Co. and is a former student of Austin.

The dedication was held during the state aviation day at the American Legion, and was attended by 10,000 people. The field is the Stout Airplane Corp., a division of the Ford Motor Co. and is a former student of Austin. The dedication was held during the state aviation day at the American Legion, and was attended by 10,000 people.

Open New Air Service

CHICAGO, ILL.—The Central Airways Corp., Chicago, Ill., has just opened up the Lincoln Highway line north of East Liverpool, the new Chicago to Cincinnati. The line will be operated by the Central Airways Corp., which is behind the project. Time from Chicago to Cincinnati will be 12 hrs. 30 min. and from Cincinnati to Chicago will be 12 hrs. 30 min. The flight will be operated by the Central Airways Corp., which is behind the project.

Special Lighting For Coast Route

*Seattle-San Francisco Airway
to be Completely Lighted
by Winter*

PORTLAND, ORE.—The Seattle-San Francisco airway will be completely lighted within four or five months according to E. E. Dwyer, survey commission superintendent for the Department of Commerce, who has arrived in Portland to supervise the survey and installation of lights. Work will be started immediately on the Portland-Seattle route, the first on the schedule.

The Department plans the establishment of a new landing field at least every 20 mi. along its route. As many as possible of the municipal fields along the way will be acquired. Mills Field is not available to the government. It will leave lands, like Bays and in the rough, which is necessary to the city. Mills Field is not available to the government. It will leave lands, like Bays and in the rough, which is necessary to the city.

Remain Open 24 Hrs.

In month, open hours 24 hours. The field is the Stout Airplane Corp., a division of the Ford Motor Co. and is a former student of Austin. The dedication was held during the state aviation day at the American Legion, and was attended by 10,000 people.

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Open 135 Acre Field At East Liverpool, O.

EAST LIVERPOOL, O.—Recently opened on the Lincoln Highway line north of East Liverpool, the new Chicago to Cincinnati. The line will be operated by the Central Airways Corp., which is behind the project. Time from Chicago to Cincinnati will be 12 hrs. 30 min. and from Cincinnati to Chicago will be 12 hrs. 30 min. The flight will be operated by the Central Airways Corp., which is behind the project.

FOREIGN ACTIVITIES

Civil Aeronautics Regulated in Cuba

Governing Body is to be Appointed in Section of Army General Staff

HAVANA, CUBA—Civil flying is scheduled on two routes and regulations governing civil aeronautics, is preparing to establish an aviation bureau in the information section of the army general staff. This step is a result of an request by Cuba of the Inter-American Civil Aviation Commission for November of 1959.

The proposed aviation bureau will handle all matters concerning civil aviation. The regulations will be, in part, period and explained by a body known as the aeronautical commission and attached to the aviation bureau. Thirty members of the army and marines will be appointed by the secretary of war and marines and will constitute the commission. These members will be chosen from the Vice Secretary of Defense and General Staff of the Army.

Conclusion to be Active

The commission will discuss and publish information on national and foreign air navigation. It will examine and approve documents, make examinations and will issue air licenses. The commission will permit a person to fly when permission is obtained for flying over national territory and will regulate the investigation, certification and examination of persons desiring to fly. It will also discuss information received by radio-club or groups regarding air navigation facilities, airports and address air prices, rates, insurance and other matters pertaining to air transportation.

Aircraft will be divided into a general group, military and private. The commission will issue a series of plans, construction regulations and imported and of pilots, mechanics and aviation instructors. The commission will inform the aviation bureau of all matters handled by the commission.

Memberships to Germany

LONDON, ENGL.—The Council of the Institute of Aircraft has accepted an invitation from the Verein Deutscher Luftverkehr und die Deutsche Gesellschaft für Luftfahrt to hold next year's annual meeting of the Institute in Germany. The meeting will take place in Düsseldorf. It is expected to prove very attractive to the host country's members.

For Jap Defense



Among one of the high powered solid rocket motors in use by the Japanese in recent missile defense maneuvers in Okinawa.

International Opens New Survey Division

OTTAWA, CANADA—A new survey section devoted to the International Air Transport Association (IATA) has been established in the general staff of the Canadian Department of Transport. The new section is being created out of a unit which was formerly part of the survey section. It is thought that some of the factors in the air traffic between Ottawa and other principal cities in the world will be established. The International Air Transport Association, formerly known as the International Air Transport Association, has been reorganized and was given a new structure. The new staff of the Department of Transport, Canada, and the International Air Transport Association, Canada, will be responsible for the survey of air transport in Canada. The company at present operates schools at Hamilton, Toronto and Montreal in addition to the new Division of Office.

Guest "Roman" in Test Flights

TRAVENSBURG, GERMANY—Test flights are being made here in the newly introduced Roman's test flying boat built by the Rahnke-Werkzeugwerke of Berlin to transport aircraft. According to reports in the flight, the test aircraft was one of the air after a 200 ft. climb. Pilot Alexander von Fries, the result reported that the Roman showed a high performance in the initial 10 sec. flight. Three E-101, a private, developing a total of 2400 hp. power the flying boat.

Large Increase Noted in Russian Air Traffic

MOSCOW, RUSSIA—A three fold increase has been noted in commercial air transport volume in Soviet Russia from 1953 to 1957, according to an announcement recently made public. Figures for 1957 show a total of 7,800 passengers and 15,000 kilograms of mail carried. During the year 1952, 2,500 passengers and the distance covered was more than 1,000,000 mi. Prior to 1951, 1,500 passengers and 700,000 mi. had been flown in Soviet commercial planes.

Services have also been in effect with increasing rapid change photography and similar records. In 1957 Soviet planes carried 70,000 tons of cargo selected loads and 5,000 tons of military was photographed for foreign service. Map making and other purposes. A 6,000-ton flight has been planned for possible reconnaissance in the Arctic region and will be made by the hydroplane, Soviet Ship. Ships will be made in various parts during the flight.

Commercial airports have been established in Moscow, Simsbury, Volok, Leningrad, Leningrad, Rostov, Krasnodar, Novosibirsk, Novosibirsk, Krasnodar and Krasnodar.

U.S. Firm at Paris Show

PARIS, FRANCE—A representative of an independent air engine and all metal truck in construction was held at the 1958 Paris Air Show. The American company was directly represented at the show, these being the Fairchild Aircraft Corp., which is a member of the General Electric and photographic group, and the Irving Air Chute Co. The company has been working on a new type of aircraft, which is being developed and is being developed. The company at present operates schools at Hamilton, Toronto and Montreal in addition to the new Division of Office.

Club Gets Third Month

MONTREAL, CANADA—The Montreal Light Aircraft Club, through a new subscription campaign for \$75,000, has been able to purchase a new Fairchild "Shark" plane. The first two months of the campaign have been successful. The club is now in a position to purchase the plane. The club is now in a position to purchase the plane. The club is now in a position to purchase the plane.

THE BUYER'S LOG BOOK

Kinnear Hangar Door

THE KINNEAR hangar door produced by the Kinnear Manufacturing Co., of Columbia, S.C., has been in use for a number of years. The doors are made in the form of flexible curtains which can withstand a very small space. They are constructed in units approximately 20 ft. in width and of any required height with sliding joints between them. When the opening is to be closed the joints are moved aside.

Hangar doors are either hand or motor operated. Each type are mounted on the face of the wall either inside or outside the hangar. The curtain is attached to the sides of the separating posts and to the end rails of the hangar. Manual operation doors are provided with one or two power units controlled by push button switches. The doors may be stopped at any point in



Hangar with Kinnear Door

their full travel and hold them indefinitely. A limit switch is provided which cuts off the current at a certain point in the travel of the curtain and immediately a stop switch is automatically applied.

Where the Kinnear door is to be used consideration must be given to the type of curtain and its material so that the curtain will carry the load. The curtains are made of non-flammable cloth rolled from copper bearing steel and heavily polished in the last process. The doors are designed to withstand the full pressure of high winds. All parts are interchangeable and may be easily replaced in case of accidental damage. The curtain requires a trouble-proof and generally automatic in operation.

Hyb-lum Alloy

THE SHEET Aluminum Corp. at Lakewood, N.J., has recently placed on the market a balanced aluminum alloy that is fundamentally new in composition and is applicable in a wide variety of products. The new alloy is known as the registered name of Hyb-lum.

Research and experimental work on the alloy was done by Victor N. Hyblum, Jr., with the advice and assistance of his father who is an officer at the Sheet Aluminum Corporation and an experienced authority on non-ferrous metals.

Due to the introduction of Hyb-lum, the alloying elements of aluminum were chiefly copper, manganese, sil-

con and magnesium. Hyb-lum departs largely from these elements, employing instead nickel and the metals of the chromium group. The total addition of all heavy metals is approximately two per cent.

Among the outstanding qualities claimed for Hyb-lum are color, non-rusting, non-corrosive, resistance to stress-corrosion, corrosion, resistance to welding, strength and ductility, non-flammable, low specific gravity, wide limits of temperature in heat treatment, and stability after heat-treatment in air at elevated temperatures.

Hyb-lum has a pure white color like that of silver and resembles the grayish blue and of aluminum. It is non-magnetic in five different classes designated A, B, C, D, E and F which differ in physical properties but are virtually the same in composition. Hyb-lum products comprise flat rolled and strip sheets, sheet coiled, extruded structural and special shapes, castings, bars and rods, wire and mesh, stampings, screw machine products and forgings. All of these can be furnished heat treated.

Oxweld Portable Unit

A COMPLETE portable welding and cutting unit is now being produced by The Oxweld Acetylene Co., of New York. The unit is a 30 ft. x 42 in. x 30 in. unit and is highly resistant to vibration and is available for emergency repair work and for general purpose work which does not require that both the welding and cutting blowpipes be used simultaneously. The Oxweld Co. is a unit of the Union Carbide and Carbon Co. and has offices in all principal cities of the United States.

The unit is mounted on a two-wheeled hand truck and is sufficiently large to accommodate the oxygen and acetylene tanks. The entire blowpipes are used as though they were supplied by a generator and the same character of work can be done with the unit.

The equipment supplied includes one Type C-14 (or C-6) cutting blowpipe with nozzle, lighter and wrench; one Type W-1 welding blowpipe with nozzle, lighter and wrench; one Type R-25 oxygen regulator with 3000 lb. gauge and 300 lb. gauge and one Type W-1 welding blowpipe with 25 ft. length of 1/2 in. oxygen hose and one 25 ft. length of 3/8 in. red acetylene hose with the necessary clamps and one pair of gauges are also furnished. Extra lengths of hose in multiples of 25 ft. can be added as desired. An instruction booklet and service charts are also supplied.

Oxweld apparatus has passed the rigid and exacting examinations of the engineers of the Underwriters'

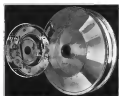


Full Mounted on Truck

Laboratory, Inc., under the direction of the National Board of Fire Underwriters. A nation-wide organization of thoroughly competent service engineers is at the disposal of users as prospective users of Bendix appliances. A complete catalogue of Bendix equipment will be sent on request to any of the branches of the company.

Bendix Brakes

ONE OF the important steps in the development of aircraft has been the incorporation of brakes to reduce landing and contribute to the ease of control of planes on the ground. The Bendix Brake Co. of South Bend, Ind., is now in production on complete units consisting of wheel and brake for airplane use. The company is prepared to supply any of the most used sizes.



Bendix-Laddner unit with cover spread showing brake assembly.

of wheel on rear axle and will supply brake assemblies also to manufacturers of other types of wheel.

The Bendix-Laddner unit is of maximum strength and minimum weight and is built in standard form. The unit is standard as given in the U. S. Air Corps specifications which are also used as a basis for axle diameter and length. The unit consists of a disc wheel with a backing cover upon which the brake shoe is mounted. The brake is of the well known two shoe Serrvo-type, which has been used for several years on some of the best known makes of automobile. It is extremely powerful and is the same type perfectly controllable, a minimum pedal pressure being required to stop a full braking effect.

Adjustment of brakes is simple and can be made entirely from the outside of the unit. Simple provision has been made to take the thrust in the wheel by the use of specially constructed thrust bearings. The wheel unit is overhauled and the valve mechanism and enables the operator to utilize the standard 45 deg. airplane valve so that no special parts need be carried along. All parts of the unit are made of high duty aluminum alloy except the springs, anchor pin and cotterpins.

Shakespeare Controls

A WIDE selection of controls for choice, radiator shutoff, heater and other purposes is offered by the Shakespeare Products Co., of Kalamazoo, Mich. Various power controls of the type employing a steel wire sliding in a flexible tube and actuated by a plunger rod. A similar control actuated by a lever is also made by the

company. The Shakespeare line has been designed with interchangeable parts so that more than 50 combinations of standard plunger and face plate patterns are available for quick delivery. Specially designed controls to fulfill the requirements of manufacturers are also produced by the company.

Shakespeare controls are well constructed, having brass push rods, knobs and body tubes for the push pull types.



Special connector head used to adapt tube and wire to rod and control.

Flexible tubing and control wires are made to special formulae to prevent crystallization and breaking. All face plates are cut from brass. Push pull types are installed without the use of screws on both and are made up in standard thickness of 1/4 in., 3/8 in. or 1/2 in. The diameter of the standard face plate is 3 1/2 in. All tubes are forced 1/16-3/32 S. A. R. Special care has been taken to prevent marking of wire and made of flexible tube and construction has been approved by the Department of Commerce.

The Aero Corporation of California

(Continued from page 533)

engine Fokker Universal, seven Fokker planes, equipped with Pratt and Whitney "Hercules" engines, will be placed in operation November 1, when an extension of the line through Douglas, Ariz., El Paso, Silverwater, Abilene, Ft. Worth to Dallas, Tex., will be opened.

A fully service on this extension is planned. Flights will leave Los Angeles at 8 A. M. and Dallas at 8:10 P. M. Tickets for the run between the cities is 13 air. The approximate traveling time by rail is 60 hr.

The aviation line has been incorporated as Standard Air Line. Mr. Pope is the president, Mr. Richter and Walter



Personnel of Aero Corporation of California.

Hamilton are vice-presidents, and E. R. Chisholm is the secretary of the new corporation. Nathan Nohy is the attorney.

It is planned next spring to further extend the line with the introduction of a branch to Tucson, Ariz., in January, 1934. The proposed route will run through Yuma, Calif.; Arizona; Hermosillo; Coahuila, central on the Gulf of California; Capatzen, Navajo, which is located on the San Navajo; San Elba and Culiacan, Mex.

Whenever the present route is government lighted for night flying the company plans to inaugurate a night service which would probably be extremely popular with

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certain classes of persons such as actors and seamen.

Present equipment at the Los Angeles terminal consists of a perfectly graded and drained field four miles from the heart of town and on a main boulevard. Two runways are provided, the east-west runway being 200 by 1600 ft. and the north-south runway 300 ft. wide and 1800 ft. long. A slope westward of one foot in 30 ft. of great assistance to planes taking off on the northwest runway. A very great deal of hangar space is available at the field, one hangar alone being able to house eight Mayhew planes, and a special Fokker hangar is provided with two shed track and truck for rapid loading. Waiting room, ticket counter, company offices, company engine and machine shop with Wright Whetstone testing stand is only part of the field equipment.

Three Intercontinental Stages

Stages will be made on signal at El Paso, Desert Center and Palm Springs to pick up passengers. Each of these points boasts a fine airport and many easy stops are made at Palm Springs, a fashionable and popular winter resort.

All Phoenix, an excellent field is provided at a distance of six miles from the business district. The field at Tucson is a 360 acre AAA airport only two miles from the business district. Terminal issue is issued at each of these fields through Kirk Moore, secretary of the Tucson Chamber of Commerce, and Attorney H. B. W. has been made.

Travel service at Los Angeles is provided by Aero Corp. cars, at Phoenix by the Elmer International System and at Tucson by Yellow Cab. This service is included in the regular fare.

Poor and Club Cooperation

Passenger patronage over this line has been greatly boosted by the cooperation of Arizona newspapers and Chambers of Commerce, and by the Los Angeles Greater Club. An interesting observation is that the great majority of passengers have been Arizona people flying to Los Angeles and back.

Victims of the run between the cities are sold by all agencies, Juan Phoenix by the Elmer International Station and from Tucson by the Yellow Cab Company. The passenger

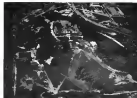


Passenger car viewed from one of the Aero Corporation of California planes in flight from Los Angeles to Phoenix.

may also 324 round trip or 330 one way between L. A. and Phoenix, 372 round trip or 380 one way, L. A. Tucson and 318 round trip or 330 one way from Phoenix to Tucson.

In addition to the passenger carrying a very important package and express service is provided with rates at

\$1.00 per lb. or fraction thereof between L. A. and Tucson. A delivery service direct to store or home is maintained at all terminals and if after three weeks the party is not heard the package will be returned to owner without additional expense. A courtesy return volume of express matter is an indication of the business to be expected from this source when business men become aware of the advantages. This freight service has been helped by signing contracts with certain lines for



The Hotel Raymond, Pasadena, Calif., as seen from the air by passengers flying the Los Angeles-Tucson route.

a guaranteed minimum monthly poundage. Terms now on contracting are: Western Air Supply, Los Angeles; Marine Oil and Refining Co. of Ariz.; National Lumber Co. Phoenix; and the Union Oil Co. of Calif. The Red Arrow Messenger Service, Los Angeles, has acted as local freight agent.

The Aero Corporation of California was organized in February 1932 with the following officers:

Laurel W. Jack, vice pres., H. A. Edwards, vice pres., Paul B. Richter, Jr., exec. comm. Charles W. Cradock, secy., and Walter A. Hamilton, 2nd vice pres.

Operating equipment at that time consisted of three combatant airplanes. At the present time there are seven Alouette Eaglets and two Fokker Universal units in daily use with a force of 25 persons on 175 payroll. Aero Corp. planes now fly at an average of 1800 mi. per day and have so far carried over 20,000 passengers without injury. This development has been accomplished by the original organization of the Company without assistance of outside funds, and is the result of applying business methods to the operation of aircraft. The Aero Corp. took the Southern California citizenship for Alexander Stephens in June 1932, the Southern part recently and the Southern California and Arizona agency for Fokker planes in April 1932.

The "Sign Carrier I"

(Continued from page 532)

of sign carrying, it may be used as a transport. A compartment has been furnished for baggage and the cabin has been equipped with seats for the accommodation of 10 passengers. The plane is powered with three engines. A Pratt and Whitney "Whip" engine is mounted in the nose, and two Wright "Whisper" engines are mounted in positions between the wings. These engines are equipped with hand inertia starters. In designing the needles for the outboard engine, sufficient

The AIRSEDAN



139 m. p. h.

By official test, the fastest ship in the Reliability Tour

Specifications

Weight Empty	1,400 lbs.
Wing Span	34 ft.
Wing Area	246 sq. ft.
Length	23 ft.
Useful Load	1,400 lbs.
Seating Capacity	Pilot and 2 Passengers

Performance

High Speed (Sea Level)	139.5 M.P.H.
Landing Speed	45 M.P.H.
Cruising Speed	115 M.P.H.

Power Plant

Engine	Whitcomb
Horsepower	200 at 1,700 S.F.M.
Fuel Capacity	30 gals.
Oil Capacity	5 gals.

Equipment

Starter, Breaker, Metal Propeller, Compass, Air Speed Indicator, Navigation Lights, Radioelectric, Altimeter, Clock, Fuel Exhauster, Fuel, Oil Pressure, and Oil Temperature Gauge, Air Corps Theodolite, Sensitive and Fuel Valve, Exhaust Manifold, Cabin Heater.

Manufactured Under Airframe Type Certificate No. 46

Price \$12,000

Factory and Field, Marietta, Michigan

Buhl Aircraft Company
MARYSVILLE, MICHIGAN

TRADE LIST for marketing AIRSEDAN

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specimen was altered so that two Pratt and Whitney Wasp engines could have been installed without overlap of desired.

With the two Whirlwinds and the Wasp engine, the plane embodies the same features of maneuverability and short-run landings and take-offs as does the Pathfinder. With a full load it has a high speed of 113 m. p. h. and a landing speed of 45 m. p. h. Its useful rate of climb is 250 ft. a min. Its range is 500 mi. Turning up 1,000 r.p.m., the three engines develop 875 hp. The fuel system has a total capacity of 350 gal. of gasoline. Dump valves, suitable for installation on a two such line are provided for both the main and auxiliary gasoline tanks, which hold 175 gal. and 145 gal. respectively. These valves are located where they may be opened and closed by the pilot. They allow the fuel to run out at the trailing edge of the wings when open. The oil system has a capacity of 31 gal.

Equipped With Pratt & Whitney

Among other features of the plane is a landing gear of the standard Army Air Service "off axle" type. The wheels have knikes and are also equipped with mudguards. The instruments selected were all manufactured by Deane Instruments Co., Brooklyn, N. Y. There are two altimeters, one of which is in the cockpit and the other in the cabin. There are two air speed indicators three tachometers, three oil pressure gauges, three oil temperature gauges, one compass, and one clock.

C. Clark Peterson, who was formerly connected with Wright Aeronautical Corp. is president of Aerial Advertising, Inc. Robert Kottick, former holder of the world's altitude record is vice-president of the Company. Charles E. Lawrence, president of the Virginia Armory



A group of officials of Aerial Advertising, Inc., and Key-Stone Aircraft Corp., conferring as they stand in front of the new Key-Stone "Sea Carrier I."

trial Corp., and Col. Benjamin F. Lavelle, president of the N. A. A., are among the directors of the organization.

The specifications on the "Sea Carrier" are as follows:

Weight Loaded (as a Transport)	11,379 lb.
Weight Loaded (as a Sea Carrier)	18,369 lb.
Weight Empty (as a Transport)	5,854 lb.
Weight Empty (as a Sea Carrier)	7,094 lb.
Upper Wing Area	986 sq. ft.

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Lower Wing (as a Transport)	554 sq. ft.
Lower Wing (as a Sea Carrier)	1,074 sq. ft.
Total Wing Area (as a Transport)	1,628 sq. ft.
Total Wing Area (as a Sea Carrier)	2,100 sq. ft.
Overall Length	44 ft. 4 in.
Upper Wing Span	75 ft.
Lower Wing Span	90 ft. 6 in.
Chord, Upper Wing	8 ft.
Chord, Lower Wing	8 ft.
Angle of Incidence, Lower	2 Deg.
Angle of Incidence, Upper	5 Deg.
Stagger	None
Incidence, Lower Wing	130 deg. at 37 ft. 4 in.
Incidence, Lower Wing	2 Deg.
Lead of Hand Carriage	15 ft. 4 in.
Wing Loading (as Transport)	30 lb. per sq. ft.
Wing Loading (as Sea Carrier)	81 lb. per sq. ft.
Power Loading (as Transport)	38 hp. per lb.
Power Loading (as Sea Carrier)	11.6 hp. per lb.
Performance with Full Load	
Full Speed (level)	115 m.p.h.
Landing Speed	45 m.p.h.
Turned Rate of Climb	230 ft. min.
Range	500 mi.
Power Plant	875 hp. at 1,000 r.p.m.
C/W Weight "Wheeland," and 1 Pratt and Whitney "Wasp"	



THE KEYSTONE "PUP"

Training Plane Development

Crawford Metal Plane

(Continued from page 518)

Two ribs with a ribse spar in the trailing edge. No ribs are used except a master rib at the rear end of each wing section. The completed wing being built in two halves joined together at the center, and is braced at the joint three feet out from the quarter at which the brace struts from the back attach. A third ribhead is used at the rear end of the wing in order that a back stay wing rib or streamline form may be held in place, thereby the streamlines and increasing the efficiency of the wing. Pulse ribs are mounted every two feet along the top of the wing from the leading edge to the second spar in order to keep the wing curve from flattening out at top.

14 Gauge Channel Section Dural Cord

Channel section dimensions of 14 gauge has been used for all spars, the dimensions being 1 1/2 in. deep and 1 in. wide across the face. This rib, drag and compression structure are carried through the covering the spars are maintained in place by diagonal cross-bracing chords extending alternately from top to bottom spars. Since the wing spar covers the spars in cross-bracing, apparently the diagonal bracing members are not varying length throughout the wing. The leading edge is formed by using two spread channel section chords staggered and riveting the top and bottom wing covering between them.

Altimeters are of 30 gauge sheeting riveted to sheet tubing and mounted to the rear spar. In three are braced along the lower side. Control is by push and pull cables and the dual is used to fair the altimeters into the wing curve at the joint.

Fuel supply is all gravity fed and is carried for by a 22 gal. gasoline tank mounted in the fuselage in front of the passenger cockpit and by two 15 gallon tanks one mounted in the rear portion of each wing section. As a gal. oil tank is mounted in the rear part of the fuselage, thereby behind the firewall.

The wing is carried to the body by eight struts of

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two in, round steel tubing. Four short struts extend from the upper longerons two to a point at the center of the leading edge and two to the wing struts at a point three feet out along the forward lower spar. Two long struts on each side extend from the lower longerons of the



The Crawford plane as it looks from the rear

trussings to the forward and rear lower spars respectively at a point three feet from the center of the wing. All struts are of steel and all moving at stress points where fittings are attached has been done with iron rivets. Other rivets throughout the plane are steel.

The excellent performance of this plane is said to be largely due to the variable incidence wing, which changes from two degrees at the center to zero degrees at the tips. The flaps throughout the entire airplane, both externally and internally in two rows of gear engine room. The original fuel tank was of the leaf spring type but this has been changed to laminated tube with quarter section and shock cord vent. All controls are push and pull tubes except the rudder which is operated by means of J. 32 in. steel wire.

The construction of the plane was carried on in a small back yard and within a 16 ft. garage. Originally started by Henry Lauerbach who now owns the airplane, the final engineering and construction was done by Harvey Crawford. Much of the sheering was done on home made wooden frames, a great deal of the landing and almost all



Side view of the all-metal Crawford plane

of the welding was done in the small garage, and the riveting was carried on by means of an air riveter supplied with pressure from a Ford operated air compressor. Many changes and delays were necessary during the time of construction, which extended over approximately an entire year due to the fact that neither Mr. Lauerbach nor Mr. Crawford could devote much of their time to the work.

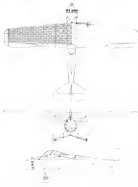
The total cost of the plane, which is now said to have proved itself to be of practical design, is said not to exceed

AVIATION
August 16, 1935

\$2700 and it is thought that the model could be produced for \$350 less than that figure if built in quantities.

Mr. Crawford and his associates are so well satisfied with the performance of this plane that designs have been drawn up for three more of varying types but all based on the design of the Crawford Model Plane No. 1. Production has already commenced on these three planes and it is said that the larger of the three, a six place cabin job is already sold. A company is being formed to exploit this type of all metal construction and Mr. Crawford has announced that a factory building will be taken over at once in order to rush completion of the new planes.

Several features of the plane now under way are of particular interest. The large plane will employ tubular chordless spars in the cordless wing and will be equipped with external struts to an additional safety factor. It will have a copy of the wing used on the German Bremen with the up turned wing tips. The entire plane



Three view drawing of the Crawford plane

is designed close to the ground for low landing, will be equipped with brakes and will carry two pilots in a forward cockpit similar to that in the Fokker. This plane will be equipped with hot and cold water and toilet facilities.

Of the small planes, one is to be a two place training plane to be available in either high or low wing design and to sell for approximately \$3500 without engine. The other plane is of similar type but will be of four place design with a new passenger arrangement that permits the cabin layout by which it is to be dispensed. Two passengers will normally ride side by side in the combined cabin under the wing but should accommodations be desired for two more persons there is a convertible cockpit



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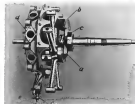
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ing to take the place on. This is very important. No trouble will appear in regard to lack of lubrication if this suggestion is followed.

One readily can observe that if the engine has not been run for several days, and then is warmed up hurriedly without working the sprayer or auxiliary hand oil pump, that the engine will not run for some length of time before lubrication will be established by the oil pump proper. It should be borne in mind that the pump operates at one-sixteenth of the crankshaft speed, which is quite ample for perfect lubrication under normal operating conditions.

There is no oil strainer in the rear end of the crankshaft, which may be removed for cleaning by taking off the tachometer drive nut, which has a left-hand thread. The strainer will not permit any foreign matter to pass into the crankshaft, thus insuring a clean oil supply. There are two other oil strainers in the lubricating system. One, located in the wing at the bottom of the crankcase, and the other in the wing at the tail and pressure pump. These strainers should be cleaned about every 15 hr. If this is not done circulation will be stopped and proper lubrication hindered.

Since the lubrication system is of an extremely low pressure type and supplies only a limited amount of oil, the engine requires not only a very high quality of mineral oil but of having the exact specifications and characteristics as that recommended by the builders of the engine. The oil should have a flash point of between 450 deg. and 470 deg. it will blend with a 50-50 oil-alcohol mixture.



A view of the crank drive of the Stevens main cylinder engine: (a) Crankshaft; (b) Crankshaft yoke; (c) Meeter rod; (d) Connection for motion pipe; (e) Oil pump; (f) The dasher.

to 50 to 100 to 250 deg. Fahrenheit and a carbon level of not more than 1.5 per cent. Proper oil must be used. Otherwise the engine will run at a higher temperature than usual. Loss of the lubrication is sufficient to prevent sticking very serious trouble will occur in case, such as scuffed cylinders, or even cracked cylinder heads. Naturally, this will reduce the total life of the engine.

The indicators used on these engines are simple in design but very efficient. For easy running it is advisable to pause the engine by filling the pressure cup with a small amount of fuel or by connecting a hand primer in series with the standard so that the engine may be primed conveniently from the cockpit. I will make several suggestions for adjusting the carburetor. If they are followed there will be no trouble in securing the maximum performance. The suggestions are as follows:

1. Check the throttle air screen to see if it is any

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Specifications of the Material

(Continued from page 529)

The body of the specification is completed, first, with a full list of the materials required, specifying their name, number, size, character, and quantity. Then, for each item of material or for the part as a whole, is specified such operation of labor, giving the drawing number, name of operation, list of tools required, color a description of what is to be done or reference to a standard instruction sheet, the rate of production to be expected for each unit in the production group, number of pieces, and total time expected. The footing of the total hours scheduled for all men on all operations gives the total work-hours while specifying the job-hours (not man-hours) scheduled for each operation gives the total scheduled time for the whole sub-assembly, as stated in the heading.

Office Copies to Show Costs

In the marginal columns at the right are extended the standardized costs of material, labor, and the overhead applying on them. These columns appear only on the office copies, and not on those that are issued to the shop. In the example shown, all the materials called for are new materials, but such specifications are themselves units in larger groups and these again in still larger ones, until the final complete airplane engine is reached, so a general many specifications will call for parts already worked, as well as for new materials.

So much for the form and data of the specification, consider, next, their use, first in specifying material, and then in specifying labor.

Drawing Shows a List of Materials

When information as to materials required can only be had by making it from the working drawings, considerable time must be spent by someone to get it. This would be a natural process, if it had to be repeated every time a part is ordered, so in such cases it is customary for the drawing to show a bill of materials. Even when a part is to be made but once or twice, a bill of materials is desirable to insure against omissions and errors. Certainly no one is more susceptible to list all the pieces, bolts, screws, etc., than the draftsman who designed the part. Here, however, we run into another difficulty. Draftsmen are dangerous, not stock clerks. They change from time to time and their training varies. Unless small parts have been well standardized and treated, and use lists of permissible standards are available to the draftsman and their use is enforced, he will call for any parts that use his convenience. Moreover, different draftsmen will call the same thing by different names. These are causes of unnecessary ordering and multiplication of kinds of stock—both very undesirable.

Should Standardize Stocks

Stocks should be standardized, and limited strictly to those kinds and sizes which have been selected. The best way to enforce these standards is to have all materials ordered by someone of mechanical experience, able to read drawings, familiar with the standards and stock on hand, not a draftsman but a "bill-of-materials clerk." In a small establishment, he may combine other duties with these. Such a person will ordinarily save his wages several times over, through holding in standards and sticking to the use of materials that are available. He may,

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Flying time—1:20:00—1:20:00

Arrived—1:20:00—1:20:00

Amount of gas used—60.0

Amount of oil used—10.0

Amount of oil used—10.0

NOTE: A GAS CONSUMPTION

OF ABOUT 30 GPM.

PER HOUR.

NOTE: A GAS CONSUMPTION

OF ABOUT 30 GPM.

PER HOUR.

NOTE: A GAS CONSUMPTION

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also, save the time of the draftsman, usually a highly-paid man, by relieving him of the labor of preparing the bills of material. When this is done, it is better to make these bills separate from the drawings. There are many advantages to be gained by so doing. These will be apparent from the area made of the specifications, which embody and extend the bills of material.

A Waste of Foreman's Time

But even when a bill of material has been correctly prepared, the materials have to be requisitioned from the stockroom, priced, credited on the stock-cards or ledgers, and charged to cost of the work. The writing of such requisitions is frequently left to the foreman or the workman. Even when he is able to copy them from existing bills of material, this is a wasteful plan, for it is requiring clerical duties of men, who are often making poor clerks, are bothered by piece work, do it hurriedly and make mistakes. Moreover, their time is much more valuable in supervision or direct production. It does not pay to do piece work on the job. It may be hard down to a penny, but, an all work where the design has been set in advance, on all, that is, except repair, experimental, or development work, the requisitions should likewise be prepared in advance by, or under the supervision of, the bill-of-materials clerk. These requisitions should then be issued to the shop work the order for the job, making unnecessary any piece work on material requisitions by foreman and workmen.

Another advantage, namely, it now becomes easy to prepare a duplicate bill and give one copy, in advance, to the stockkeeper. He is enabled to get these materials together in spare moments, often a day or two before they are required, and have them ready for the foreman's call. This saves a lot of waiting at the stock-room window, with men and machines standing idle. The stockkeeper is also enabled to get in supplies if he is running short, and so save hold-ups on the job. If special materials have to be purchased, the bill-of-materials clerk is also in position to start the "ball rolling" promptly.

Copied from Bills of Material

One method of preparing these pre-written requisitions is to have them copied by a typist from the bills of material. By having the typist prepared in long perforated strips of the "finger-tip" type, this may be done readily. In some cases, this is found desirable, but if the bills of material are prepared in proper form so that they can easily be multiplied in quantity by long-printing or dot-matrix, they themselves may be used as the store-room requisitions, so effecting a considerable saving in clerical labor. When this plan is followed, the foreman and the stockkeeper each receive a copy, bearing the number of the production order. The stockkeeper gives the material order and the foreman sends for it, either all at one lot, or for such items as he needs from time to time. As these are delivered, the stockkeeper checks them off on his copy. He may get the foreman's signature if desired. When all have been delivered, the stockkeeper sends his copy to the office to be placed, credited to stores, and charged to work in process. No other material thus called for on the bill of material may regularly be drawn out for standard production. If some of it is spoiled, and must be replaced, a special requisition is required, approved by some one in authority, who will keep into the costs of the spoilage and place the responsibility. This plan does away with all requisition writing by foreman and workmen on standard work, and is the plan illustrated and recommended here.

Specification of Labor will be taken up by the author in another article, which will appear in an early issue.

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SIDE SLIPS

By ROBERT R. OSBORN

The papers state that a recent bride, arriving on a motor to New York, was welcomed by a shower of rice thrown by friends who went out to meet the ship in an airplane. "We must point out again that it is a dangerous practice to use an airplane in a wedding celebration, as there is always the possibility of the plane getting control too, and throwing a couple of shoes."

About a week ago the air liner "Flying Scotsman" was a race from London to Edinburgh by only a quarter of an hour from the train "Flying Scotsman," the plane making two stops and the train none,—confirming the well-established belief that the Scotch moss are slow.

The State Agriculture Departments of Nevada and Oregon have decided that the airplane has proved itself to be of great value to the farmers of those states, sending out announcements to that effect in the newspapers. We can add similar testimony on behalf of the farmers in New York State, particularly those on Long Island. Most of them were eager to show a good crop at all, and the recent boom in aviation stocks, and all of the new farms began to have forced landings in their potato patches and corn fields, at about one hundred dollars per bushel.

A new sight-seeing service has opened up in New York City using infrared flying boats. The passengers are taken for a tour of the harbor ending a circle around the Statue of Liberty, after obtaining their tickets at the usual tourist ticket agencies. So don't be surprised if on your next visit to New York a tourist speculator sales up to you and offers two on the side, only two more back of the pilot.

As the Hapless Political Party, sponsored by Life, has for its candidate for president, Mr. Will Rogers, the famous Ambassador Without a Portfolio, and American Real Estate Commissioner, we'll like to put in a good word for him. He has been practicing and practicing travel by air (for years now, and some share of the present boom in aviation must be credited to him). As a recent announcement of his platform plans we feel: "We're going to eliminate Party Leaders, Senators, Bell-Whistle, Luncheon Clubs, Vice Presidents, Stand Holes, Conventions, Golf Parks, and Lots of Other Things." If Mr. Rogers will include among the Other Things for elimination the publicity seekers who are presently roaming and squabbling on some of America's dead birds, and the editors with the complex for horrible but tragically delicate of the world, we can promise him at least 30 votes. We'd like to promise more, but as it is we may have to repeat a couple of times ourselves, as we have found only seven people so far who will admit they read this column.

Mr. George A. Wiles, Jr., tells us that he had a few bad moments the other day when he was talking to several customers and another customer, who is a close friend, came in the office and started pounding the desk. "You're a crook," he said, "and I want my money back." "Why, what's the matter?" asked George. "It's that purchase you sold me yesterday. I got jumped with it from 10,000 ft. and it didn't open at all."

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A scratch means - "Throw it away!"

WRIGHT Workmen do not know how to "fix" a scratch... These men, whose high technical and mechanical skill is supplemented by their feeling of personal responsibility, do not know how to remedy a defect in any finished part for a Wright engine... Their only comment when a flaw is met is "throw it away" ... A scratch however slight, a defect visible perhaps only through a microscope, is the "unlocked door" toward which stresses in the metal might strain for release.

That is why visitors to the Wright plant see discarded finished parts—to the average eye perfect in every detail—but to the searching eye of a Wright inspector unfit for service.

Nothing is left to chance in building Wright engines. Every operation is done by an expert in that individual field; every operation is inspected by another expert, before the completed, perfected and approved parts are accepted for

assembly... There is no secret behind the performance of Wright engines. Every part in the Wright engine bears the Wright name. Every part in the Wright engine is as important as every other part. Every part in the Wright engine is the individual product of specialized workmen who know that the slightest departure from the highest standard may wreck the whole.

Every part in the Wright engine is sound, solid, tested and retested, made from the start to be tougher than the service it must give, and built from rough stock to assembly with full knowledge of its important function in the completed engine. Exactly what Wright engines will do is known.

For more than a decade Wright has been building engines with just such care as this... to produce aircraft power plants that measure up to the highest standard of excellence... an unchanging policy which explains Wright engine performance. That is why "more pilots fly them".



Wright "Cyclone"
Aeronautical
Engine



Wright "Whirlwind"
Aeronautical
Engine

*That's why
More Pilots fly them!*

WRIGHT

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Pacific Aeromotive Corp.—Los Angeles, Cal.

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